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BEFORE THE IDAHO PUBLIC UTILITIES COMMISSION

IN THE MATTER OF THE APPLICATION) CASE NO. AVU-E-14-07
OF AVISTA CORPORATION FOR A) CASE NO. AVU-G-14-02
FINDING OF PRUDENCE FOR 2013)
EXPENDITURES ASSOCIATED WITH)
PROVIDING ELECTRIC AND NATURAL GAS) DIRECT TESTIMONY
ENERGY EFFICIENCY SERVICE IN THE) OF
STATE OF IDAHO) M. SAMI KHAWAJA
)

REPRESENTING
THE CADMUS GROUP, INC

FOR AVISTA CORPORATION

(ELECTRIC AND NATURAL GAS)

1 I. INTRODUCTION

2 Q. Please state your full name, business address, and
3 company name.

4 A. My name is M. Sami Khawaja, and my business address
5 is 720 SW Washington Street, Portland, OR 97205. My
6 employer is The Cadmus Group, Inc.

7 Q. On whose behalf are you presenting testimony in this
8 proceeding?

9 A. I am testifying on behalf of Avista Utilities.

10 Q. Have you previously submitted testimony in this
11 proceeding?

12 A. No, I have not.

13 Q. Please describe your qualification.

14 A. I hold a doctorate degree in Economics and Systems
15 Science. I have been conducting demand side management
16 (DSM) program impact and process evaluations since 1983. I
17 am the author of the *Electric Power Research Institute*
18 *Impact Evaluation Guide*, coauthor of the *International*
19 *Performance, Measurement, and Verification Protocols*,
20 coauthor of the *Environmental Protection Agency National*
21 *Action Plan for Energy Efficiency Impact Evaluation Guide*,
22 and author of over 30 papers on evaluation issues. I have

1 taught over 40 evaluation and cost-effectiveness workshops
2 nationally and internationally. I am one of the
3 Association for Energy Service Professionals trainers. I
4 am currently an adjunct professor of economics at Portland
5 State University.

6 **Q. Describe your current and previous job**
7 **responsibilities.**

8 A. I am currently an executive consultant for The Cadmus
9 Group and previously managed the Energy Service Division
10 for five years (a group of 200 energy professionals). In
11 1998 I started an energy efficiency evaluation and
12 planning firm called Quantec. The company grew to 60
13 professionals and was purchased by Cadmus in 2008. Prior
14 to that I held various positions at other consulting
15 firms, PacifiCorp, and Portland State University.

16 **Q. Describe your involvement in the delivery of Avista**
17 **DSM programs.**

18 A. The Cadmus Group was retained by Avista to serve as
19 the third-party independent evaluator of its 2012 and 2013
20 DSM programs in Idaho and Washington. As such, we
21 conducted impact and process evaluations of the programs
22 in the residential, nonresidential, and low income

1 sectors. The evaluation covered both electric and natural
2 gas programs.

3 **Q. Were the evaluations prepared in accordance with**
4 **industry standards?**

5 A. Yes. All evaluations were conducted in a manner
6 meeting industry standards and established protocols.
7 These include: (1) International Performance Measurement
8 and Verification Protocols: Concepts and Options for
9 Determining Energy and Water Savings Volume 1, January
10 2012 (2) Model Energy Efficiency Program Impact Evaluation
11 Guide: A Resource of the National Action Plan for Energy
12 Efficiency, November 2007; (3) Electric Power Research
13 Institute: Guidebook for Energy Efficiency Program
14 Evaluation, Measurement, and Verification, 2008, and (4)
15 the Department of Energy Uniform Methods Protocols, 2013.

16 **Q. Have you conducted similar portfolio-level**
17 **evaluations before?**

18 A. Yes. Under my supervision, Cadmus has recently
19 completed similar portfolio-level evaluations for the
20 following electric and natural gas utilities:

- 21 1. Ameren UE Missouri.
- 22 2. Ameren Illinois Utilities.

- 1 3. Questar (Utah).
- 2 4. California Public Utilities Commission.
- 3 5. DTE Energy (Michigan).
- 4 6. Consumers Energy (Michigan).
- 5 7. Salt River Project (Arizona).
- 6 8. PacifiCorp (Oregon, Washington, Idaho, and Utah).
- 7 9. Progress Energy (Carolinas).
- 8 10. PECO (Pennsylvania).
- 9 11. PPL (Pennsylvania).
- 10 12. Dayton Power & Light (Ohio).
- 11 13. Empower (Maryland).
- 12 14. Focus on Energy (Wisconsin)

13 **Q. Have your evaluations elsewhere been reviewed by**
14 **Public Utility Commissions or state-level evaluators?**

15 A. Yes. In all cases listed in the previous question,
16 the evaluations were either reviewed and approved or are
17 in the process of being reviewed and approved by the
18 representative utility commissions.

19 **Q. What is the purpose of your testimony?**

20 A. The purpose of my testimony is to present the
21 findings of our evaluations for the 2013 time period.

1 Q. Describe Cadmus' approach to conducting evaluations
2 of DSM programs.

3 A. Cadmus strongly believes that the best value
4 evaluators can provide is real-time feedback to program
5 managers. Real-time feedback allows for continuous
6 improvements and course corrections as needed. We have
7 worked closely with Avista's Planning, Policy, and
8 Analysis (PPA) and Implementation teams to implement
9 recommended corrections from the beginning of the
10 evaluation. We also worked closely with the stakeholders
11 represented in the various technical and policy groups.

12 Q. Describe Avista's energy efficiency internal
13 Organization structure.

14 A. Avista previously had created two distinct groups for
15 the purpose of delivery of DSM programs. One team was
16 directly responsible for implementing the programs
17 (Implementation team) and another was responsible for
18 planning and analysis (PPA team). We reported directly to
19 the PPA team. In July, 2014, the PPA and implementation
20 teams began reporting to a central manager.

21 Q. Are you sponsoring any exhibits to be introduced in
22 this proceeding?

1 A. Yes. I am sponsoring Exhibit No. 3, Schedule 1 that
2 presents our 2013 electric portfolio impact report,
3 Exhibit No. 3, Schedule 2 which is the 2013 natural gas
4 portfolio impact memo, and Exhibit No. 3, Schedule 3 which
5 is the 2012-2013 portfolio-wide process evaluation.

6 **Q. Please describe any data collection and activities**
7 **associated with the evaluation.**

8 A. Full impact evaluations were performed for the
9 electric portfolio covering the low income, residential,
10 and nonresidential sectors. Although natural gas programs
11 were suspended in Idaho prior to 2013, there were several
12 instances where natural gas savings were achieved due to
13 grandfathered projects or dual fuel saving measures. Thus,
14 we also completed a limited evaluation for gas-saving
15 measures in the residential and nonresidential sectors.
16 The low income impact evaluation included billing analysis
17 of electric and conversion measures using the entire
18 population of 2012 participants and results applied to
19 2013 participants. The nonresidential impact evaluation
20 performed 147 site and/or metering visits, individual site
21 billing analyses, simulation modeling, and general
22 engineering calculations. Teams of engineers spent several
23 weeks in the field at different points in 2013 and 2014.

1 The residential impact evaluation was informed by billing
2 analyses of the weatherization program and conversion
3 program. A participant and control group billing analysis
4 was performed for the residential behavior program as
5 well. Savings analysis utilizing the Regional Technical
6 Forum (RTF), Avista's 2012 Technical Reference Manual
7 (TRM), and engineering analyses was performed on all
8 measures, including the lumen equivalents method in
9 conjunction with RTF inputs for lighting savings. 357
10 phone surveys were conducted for the residential measure
11 verification and over 2,000 general population surveys.

12 The process evaluations completed 357 residential
13 participant, 2,160 residential general population, 201
14 nonresidential participant, and 140 nonresidential non-
15 participant surveys. The evaluations also included 20
16 contractor interviews, as well as interviews with several
17 implementation contractors, Avista PPA and implementation
18 staff. The process topics covered included participant
19 feedback, program management and design, trade ally input,
20 data tracking, marketing and outreach, a detailed analysis
21 of nonresidential realization rates and tariff compliance,
22 and a benchmarking of industry best practices. Details on
23 each of these evaluation activities and results can be

1 found in the associated Cadmus reports: Avista 2013 Idaho
2 Electric Impact Evaluation Report, Avista 2013 Idaho
3 Natural Gas Savings Memo, and Avista 2012-2013 Process
4 Evaluation Report.

5 Q. Please summarize the Company's gross electric energy
6 efficiency-related savings for this time period.

7 A. As shown below in Table 1, 25,899 MWh of gross energy
8 savings were acquired through Avista's Idaho DSM projects
9 between January 1, 2013, and December 31, 2013. The
10 electric portfolio had a realization rate of 102.7%.

11 **Table 1. Reported and Evaluated Electric Savings**

12

Segment	Reported Savings (kWh)	Gross Evaluated Savings (kWh)	Realization Rate
Residential	5,130,507	5,933,197	115.6%
Nonresidential	17,602,253	16,595,342	94.3%
Low Income	292,767	499,901	170.8%
Residential Behavior	2,194,322	2,870,905	130.8%
Total	25,219,849	25,899,345	102.7%

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17 Q. What are the gross electric energy savings by
18 program?

19 A. The 2013 program year's gross savings are summarized
20 in Table 2 by program.

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Table 2. Evaluated Electric Savings by Program

Sector	Program	Gross Evaluated Savings (kWh)
Low Income	Non-Conversion	179,628
	Conversion	309,964
	Heat Pump Replacement	10,309
Nonresidential	Site Specific	7,944,237
	Prescriptive	6,978,966
	EnergySmart Grocer	1,672,139
Residential	Simple Steps, Smart Savings	4,750,306
	Second Refrigerator and Freezer Recycling	368,174
	ENERGY STAR Products	29,011
	Heating and Cooling Efficiency	144,480
	Space and Water Conversions	506,078
	Weatherization/Shell	90,471
	Water Heater Efficiency	5,487
	ENERGY STAR Homes	12,550
	Geographic CFL Giveaway	26,640
	Residential Behavior	2,870,905
TOTAL		25,899,345

Q. What are the Company's net electric energy savings for this time period?

As shown below in Table 3, 21,999 MWh of net energy savings were acquired through Avista's Idaho DSM projects between January 1, 2013, and December 31, 2013. The electric portfolio had an overall NTG ratio of 85%.

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Table 3. Evaluated NTG and Net Electric Savings

Sector	NTG	Net Evaluated Savings (kWh)
Residential	92%	8,063,080
Nonresidential	81%	13,436,118
Low Income	100%	499,901
Total	85%	21,999,099

Q. Did Avista achieve its filed electric goals for 2013?

A. Yes, the both the Idaho Integrated Resource Plan (IRP) and Avista Business Plan goals were satisfied in 2013 (Tables 4 and 5).

The IRP goals are portfolio-level targets, so in order to conduct sector-level comparison, Cadmus adopted the Avista Business Plan goals by sector, and applied those proportions to the IRP targets. The tables also show savings achievements for the portfolio Residential Behavior programs. IRP goals are still exceeded.

Table 4. IRP Goals and Evaluated Savings

Sector	Savings Goal (kWh)	Achieved (kWh)	Achievement Rate
Residential	7,697,009	8,063,080	104.8%
Nonresidential	10,849,696	13,436,118	123.8%
Low Income	462,495	499,901	108.1%
Total	19,009,200	21,999,099	115.7%
Excluding Residential Behavior	19,009,200	19,128,194	100.6%

1 **Table 5. Avista Business Plan Goals and Evaluated Savings**

2

Sector	Savings Goal (kWh)	Achieved (kWh)	Achievement Rate
Residential	8,547,340	8,063,080	94.3%
Nonresidential	12,048,322	13,436,118	111.5%
Low Income	513,589	499,901	97.3%
Total	21,109,251	21,999,099	104.2%
Excluding Residential Behavior	21,109,251	19,128,194	90.6%

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6 **Q. Please summarize the Company's natural gas energy**
7 **efficiency-related savings for this time period.**

8 **A. As shown below in Table 6, over 51,000 therms of**
9 **energy savings were acquired from the Idaho DSM projects**
10 **between January 1, 2013, and December 31, 2013. The 2013**
11 **natural gas portfolio had a realization rate of 105%.**

12 **Table 6. Expected and Evaluated Natural Gas Savings**

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Sector	Reported Savings (therms)	Gross Evaluated Savings (therms)	Realization Rate
Nonresidential	18,192	18,580	102%
Residential	1,743	2,561	147%
Residential Behavior	29,498	30,631	104%
Total	49,433	51,772	105%

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17 **Q. What were the natural gas energy savings by program?**

18 **A. The 2012-2013 program savings are summarized in Table**
19 **7 by program.**

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1 **Table 7. Natural Gas Evaluated Savings by Program**

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3 Program Name	4 Evaluated Gross Savings (Therms)
5 Nonresidential Prescriptive	2,135
6 Nonresidential Site Specific	16,445
7 Attic Insulation with Natural Gas Heat	279
8 Wall Insulation with Natural Gas Heat	370
9 Natural Gas Boiler	141
Natural Gas Furnace	722
Clothes Washer With Natural Gas Water Heater	420
Simple Steps - Showerheads	630
Residential Behavior	30,631
Total	51,772

10 Q. What were the key findings of the residential process
11 evaluation?

12 A.

- 13 • Participation levels in many of Avista's residential
14 programs trended downward during PY2012 and PY2013.
15 Many factors contributed to the downward trend,
16 including reduced measure offerings and the 2013
17 discontinuation of natural gas incentives in Idaho.
18 The trend experienced by Avista's programs is similar
19 to participation trends in other regional utility DSM
20 programs.
- 21 • The Simple Steps, Smart Savings program saw increased
22 participation, partly due to new measure offerings.

1 Energy-efficient showerheads were added in 2012 and
2 LEDs were added in 2013.

- 3 • Avista's overall program design is effective, but
4 there is room for improvement around internal
5 communication between Avista staff.
- 6 • Avista staff showed a strong commitment to customer
7 satisfaction, achieving fast rebate processing
8 despite increasing complexity of applications. Avista
9 staff have also taken steps to improve data tracking,
10 such as integrating additional program data into a
11 central database.

12 In addition, program marketing through mass media
13 channels had to be tailored to avoid customer
14 confusion about different incentive offerings in
15 Idaho and Washington.

- 16 • Key sources of program information for customers
17 included contractors (17% in 2012; 28% in 2013), bill
18 inserts (16%; 16%), and word of mouth (10%; 14%).
19 Changes in information sources reflected changing
20 program offerings such as the elimination of
21 appliance rebates in 2013.

1 3,215 customers Cadmus surveyed in 2012 and 2013, 113
2 (or roughly one in every 28 customers) reported a
3 spillover measure.

4 **Q. What were the key findings of the nonresidential**
5 **process evaluation?**

6 A.

- 7 • Program participants were more likely than
8 nonparticipants to own their facilities: according to
9 surveys (78% of participants owned their facilities,
10 compared with 67% of nonparticipants).
- 11 • Overall, participants reported high satisfaction
12 ratings. The vast majority were "very satisfied": 87%
13 for Prescriptive, 75% for Site-Specific, and 88% for
14 EnergySmart Grocer. Only a handful of customers
15 (roughly 1%) reported any level of dissatisfaction.
- 16 • All three nonresidential programs received the same
17 satisfaction ratings or better than they did in 2011,
18 with the EnergySmart Grocer program showing a 23%
19 increase in "very satisfied" customers over 2011.
- 20 • Contractors were the primary source of program
21 information for nonresidential program participants

1 (37%). Other common sources of information were word
2 of mouth (23%) and direct contact with Avista (17%).

3 • Among nonparticipants, awareness of Avista's energy-
4 efficiency rebates has remained fairly constant since
5 2010, with around 4 in 10 nonparticipants being aware
6 of the programs (38% in 2013).

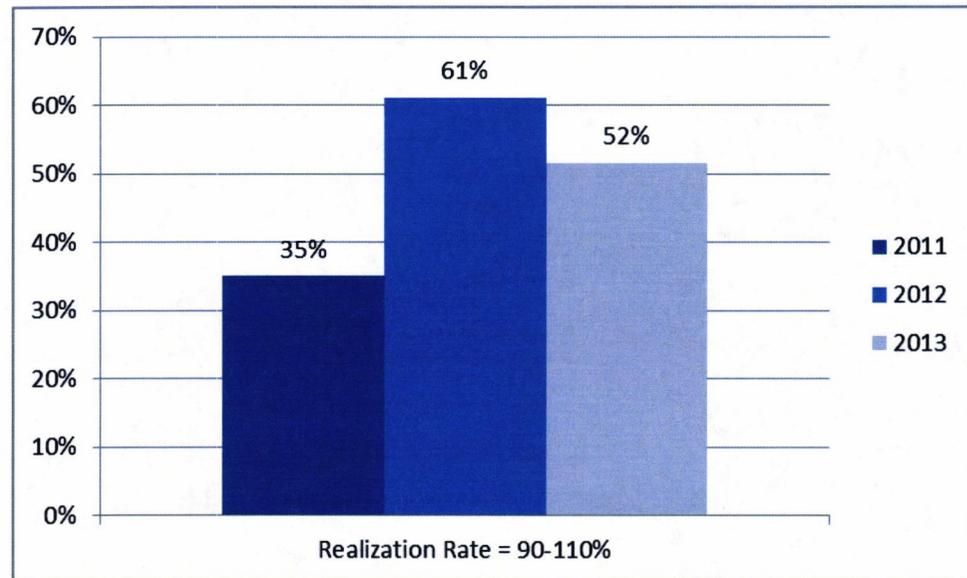
7 • Avista's management and implementation of DSM
8 programs has had some persistent organizational
9 challenges, which may have impacted the effectiveness
10 of implementation processes. While not limited to any
11 specific part of Avista's DSM staff, many of the
12 issues have primarily affected the nonresidential
13 program processes.

14 • Cadmus' review of Avista's implementation and QA/QC
15 processes showed that the accuracy of project savings
16 estimates has increased since 2011, but there is
17 still room for improvement. The Figure below shows
18 the percentage of electric realization rates for
19 site-specific projects that fell within the range of
20 90% to 110%. This range indicates a good level of
21 accuracy in reported savings.

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1 **Figure No. 1. Nonresidential Site-Specific Project Electric Realization Rates**

2 **2011-2013**



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- Cadmus' interviews with lighting contractors - conducted as a supplement to the ongoing Panel Study research - revealed that Avista's programs increase sales of energy-efficient lighting equipment for both participating and nonparticipating contractors: 16 out of 20 reported that their sales increased because of Avista's programs.
 - The prescriptive program showed 9% freeridership in 2013, showing a large decrease in freeridership as compared to the 2011 result. The site-specific

1 program showed 30% freeridership in 2013, showing an
2 increase as compared to 2011.

3 Q. What recommendations resulted from the residential
4 impact and process evaluations?

5 A.

- 6 • Consider updating per-unit assumptions of recycled
7 equipment to reflect the findings in this evaluation.
- 8 • If clothes washer rebates are ever reinstated, Avista
9 should continue to track them all within the electric
10 program unless there is a large increase in
11 penetration of gas dryers.
- 12 • Increase measure level detail capture on
13 applications. Specific additional information should
14 include energy factors or model numbers for
15 appliances, baseline information for insulation, and
16 home square footage, particularly for the ENERGY STAR
17 Homes.
- 18 • Consider tiered incentives by rating as higher SEER
19 systems generally require ECM fan motors.
- 20 • Consider completing a lighting logger study within
21 its territory if Avista believes the results of the

- 1 with offerings articulated in annual business plans
2 and other planning materials.
- 3 • Consider ways to encourage repeat participation (such
4 as marketing targeted at previous participants and
5 online profiles that reduce application paperwork).
 - 6 • Continue use of customer freeridership and market
7 assessments as a way to assess the appropriateness of
8 measure offerings.
 - 9 • Develop a transparent process for assessing measure
10 or program cost-effectiveness and communicating
11 results internally. Consider ways to ensure high-
12 quality cost-effectiveness analysis that aligns with
13 industry best practices, such as obtaining an
14 objective third-party review of current cost-
15 effectiveness screening processes.
 - 16 • Continue Avista's commitment to customer
17 satisfaction, but monitor:
 - 18 ▪ Increased staffing costs; and
 - 19 ▪ Impacts of the 90-day participation window on
20 freeridership.
 - 21 • Utilize survey results from this evaluation and other
22 data collection activities to understand which

1 audiences are more likely to participate in Avista
2 programs.

3 Q. What recommendations resulted from the nonresidential
4 impact and process evaluations?

5 A.

- 6 • Create a quality control system to double-check all
7 projects with savings over 300,000 kWh.
- 8 • Avista may want to consider tracking and reporting
9 demand reduction to better understand measure load
10 profiles and peak demand reduction opportunities.
- 11 • Update prescriptive measure assumptions and sources
12 on a regular basis.
- 13 • Streamline file structure to enable reviewers more
14 easily identify the latest documentation.
- 15 • Continue to perform follow-up measure confirmation
16 and/or site visits on a random sample of projects (at
17 least 10%).
- 18 • Consider flagging sites for additional scrutiny when
19 the paid invoice does not include installation labor
20 as it may indicate that the work was not yet
21 performed.

- 1 • Avista may consider adding a flag to their tracking
2 database to automatically detect potential outliers
3 (e.g., savings per dollar [kWh/\$ or therm/\$]).
- 4 • In the case of redundant equipment, Avista may want
5 to consider incenting pump projects through the Site-
6 Specific Program to more accurately characterize the
7 equipment operating hours.
- 8 • Avista may want to set minimum standards for modeling
9 design guidelines. The Energy Trust of Oregon
10 provides an example on their website.
- 11 • Avista should continue efforts to define and document
12 program processes. Cadmus understands that a
13 reorganization of the DSM group has occurred
14 concurrent to the delivery of this report. This
15 change may be an opportunity for fresh perspectives,
16 clarified responsibilities, and improved coordination
17 within and between teams. We believe unifying the
18 organizational structure under central leadership is
19 a step in the right direction and may help alleviate
20 some previously documented issues with internal
21 communications.

1 implementation, Cadmus recommends that Avista
2 determine and document the specific requirements
3 and steps in the QA/QC process through a
4 collaborative process that will ensure
5 accountability and balance needs for efficiency and
6 customer satisfaction.

7 o Conduct an external third-party review of Top
8 Sheets, including reviewing a random sample of
9 completed Top Sheets for completeness and accuracy.
10 These were not reviewed as part of the current
11 process evaluation, but should be included in the
12 next process evaluation. Review should not only
13 verify the presence of the Top Sheets, but also the
14 quality and accuracy of the information provided.

15 **Q. What recommendations resulted from the low income**
16 **impact evaluations?**

17 **A.**

- 18 • Consider including a control/comparison group in
19 future billing analyses.
- 20 • Consider options for increasing the analysis sample
21 size due to small program populations (such as
22 combining Washington and Idaho program participants).

- 1 • Obtain a full list of weatherization measures from
2 agencies.
- 3 • Consider targeting high-use customers.
- 4 • Track and compile additional data from agency audits.
- 5 • Consider performing quantitative, non-energy benefit
6 analyses.

7 **Q. Based on the process evaluation findings, were the**
8 **programs delivered efficiently?**

9 A. Yes, compared to similar undertakings by other
10 utilities, they were.

11 **Q. Can you please summarize your testimony.**

12 A. Yes. I believe the Avista evaluation addresses all
13 measurement and verification needs in accordance with
14 industry and regulatory standards. Impact evaluation on
15 the 2013 program years verified electric savings exceeding
16 IRP and Avista Business Plan goals. The process evaluation
17 revealed that the programs are run efficiently and some
18 areas for improvement exist.

19 **Q. Does that complete your pre-filed direct testimony?**

20 A. Yes, it does.

21